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The Precautionary Principle: Radiofrequency Exposures from Mobile Telephones and Base Stations

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Dolan and Rowley (2009) reported that the precautionary principle "is not appropriate to policy on the use of mobile telephones and the siting of base stations" because there is no established health hazard from the exposure to low-dose radiation. The guidelines [International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998] provide guidance on protection only from thermal effects (when an increase in body temperature causes injury to the tissue for a short period of time). These guidelines do not cover effects on humans or the environment from nonthermal effects [i.e., effects from electromagnetic fields (EMF) or chronic exposure that do not increase body temperature]. These nonthermal effects of EMF have been well documented by Belyaev (2005) and Sage et. al. (2007). Therefore, the precautionary principle is needed to protect the environment from these effects. Several reports have recommended use of the precautionary principle for these exposures [Herberman 2008; International Commission for Electromagnetic Safety (ICEMS) 2006, 2008; Russian National Committee on Non-Ionizing Radiation Protection 2008; Sage et al. 2007]. I do not agree with Dolan and Rowley (2009) that there is no plausible hazard to humans from the exposure to low-dose radiation. Clinical diseases caused by environmental exposures develop after a long period of biochemical changes; during this time, the exposed individual may or may not have symptoms. For example, in stomach cancer, biochemical changes may occur 10–20 years before the appearance of the cancer.

Dolan and Rowley (2009) also stated that risks can be seen with other activities such as "transport (including aviation) and hot showers." These risks result from the individual's choices and are not comparable to exposure to electromagnetic radiation from base stations, which is a constant, chronic exposure that occurs without the individual's knowledge and permission.

The past has taught us many lessons about risk from environmental exposures. For example, the lack of full scientific proof concerning the adverse effects of asbestos and the delay of precautionary action had devasting consequencies to human health [World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) 2005]. If asbestos had been banned in 1965, when the effects of asbestos on mesothelioma were plausible but unproven, the Netherlands alone would have saved approximately 52,000 victims and €30 billion for 1969–2030. An estimated 250,000–400,000 deaths from mesothelioma, lung cancer, and asbestosis caused by past asbestos exposure will occur the next 35 years in the European Union (COMEST 2005).

In conclusion, concerning the exposure to electromagnetic fields, the precautionary principle should be applied to protect humans from environmental effects of nonthermal mechanisms.

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The Precautionary Principle: Dolan and Rowley Respond

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We thank Zinelis for his interest in our article (Dolan and Rowley 2009). However, it appears from his comments on the recommendations of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), that he misunderstands the scientific basis and scope of the evidence used to establish those exposure guidelines. The ICNIRP (1998) stated clearly that for the frequencies relevant to mobile communications the restrictions are "provided to prevent whole-body heat stress and excessive localized tissue heating." This is based on evidence of established health effects. In respect to claims of effects from low-level and modulated exposures, the ICNIRP (1998) stated that

> Overall, the literature on athermal effects of AM [amplitude modulated] electromagnetic fields is so complex, the validity of reported effects so poorly established, and the relevance of the effects to human health is so uncertain, that it is impossible to use this body of information as a basis for setting limits on human exposure to these fields.

The ICNIRP keeps the scientific evidence under review and recently restated that the 1998 recommendations remain valid (ICNIRP 2009), again noting in respect of claims of nonthermal affects that

> With regard to non-thermal interactions, it is in principle impossible to disprove their possible existence but the plausibility of the various non-thermal mechanisms that have been proposed is very low.

Zinelis makes an analogy with risks from asbestos; however, this is flawed. By way of example, animal studies show evidence of harm from exposure to asbestos (International Agency for Research on Cancer 1987), whereas in respect to radiofrequency exposures, the animal studies consistently show that carcinogenic effects are not likely, even at exposure levels above those from mobile telephones (Scientific Committee on Emerging and Newly Identified Health Risks 2009).

We do accept the involuntary nature of exposure to radio signals from base stations; this in integral to providing the mobile phone services that almost 4 billion people voluntarily use and is a matter for risk perception, not risk assessment. We conclude by reiterating that the precautionary principle cannot be used to justify measures to restrict radio frequency exposures from mobile phones or base stations when there is no scientifically plausible evidence of a hazard to human health.

Both authors are employed by trade associations representing the mobile communications industry. The views expressed in this letter are those of the authors and do not necessarily represent the views of any organizations or companies with which they are professionally associated.

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